

REMARKS

Claims 1-9, all the claims pending in the application, stand rejected. Claims 4 and 9 are amended. Claims 3 and 8 are cancelled. New claims 10-30 are added.

Specifically, original claims 3 and 8, which the Examiner asserts are improper product-by-process claims, have been cancelled. On the other hand, original claims 4 and 9, which also were asserted by the Examiner to be product-by-process claims, are amended.

Finally, new claims 10-30 are added. In particular, new claim 12 is based on the description on page 8, lines 16-18 in the original specification. New claims 29 and 30 are based on the descriptions on page 8, lines 21-25 and page 11, lines 18-19, respectively.

Claim Rejections - 35 USC § 102

Claims 1-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Shiota (US 2002/0122991). This rejection is traversed for at least the following reasons.

As a first preliminary matter, the Examiner states that “regarding claims 1 and 4, Shiota et al. teach a halftone phase shift mask blank for use in manufacturing a halftone phase shift mask which has a transmission portion for transmitting an exposure light, and a phase shifter portion for transmitting a part of the exposure light and for shifting a phase of the transmitted light by a predetermined amount on a transparent substrate.”

Applicants believe that this comment is in error and that the reference by the Examiner is properly to claims 1 and 5. **Correction or clarification for the record is requested.**

In framing the rejection, the Examiner also makes reference to “regarding claims 3, 8, and 9,”

Applicants also believe that this is an error and should reference “claims 3, 4, 8, and 9,” **Again, correction or clarification for the record is requested.**

Second, as to claims 3 and 8, the rejection is moot in view of the cancellation of these claims.

Turning next to the rejection of claims 1, 2, 4-7 and 9, Applicants respectfully note that the claims 4 and 9 have been amended.

Claims 1, 4, 5, 9, 24, and 25

With respect to the currently pending claims, the present invention as defined by independent claims 1, 4, 5, 9, 24, and 25 is characterized by the formation of the ammonium ion production preventing layer on the thin film (includes the light shielding film, the reflection preventing film, or the light-semitransmissive film). The ammonium ion production preventing layer is for preventing production of ammonium ion and thereby preventing the deposition of ammonium sulfate onto the surface of the lithography mask or the halftone phase shift mask. In addition, the ammonium ion production preventing layer may be formed at a surface portion of the thin film by carrying out the heat treatment to the thin film.

Shiota

Shiota discloses the technique which uses the SiON film having a specific ratio as the phase shift film, in order to improve the exposure light irradiation tolerance, chemical resistance, etc. in short wavelength. Further, Shiota discloses a technique which forms the etching stopper (ES) film between the substrate and the SiON film, in order to improve pattern processability.

The materials of the ES film are of one type selected from Mo, Cr, Ta, Si, etc., or two or more types of materials or their compounds (oxide, nitride, oxynitride). However, the mask of Shiota is structured in order of substrate - etching stopper film - SiON film (phase shift film).

On the other hand, the mask of the present invention is structured in a different order. Specifically, the order is of substrate - thin film (light semitransmissive film) - ammonium ion production preventing layer and is quite different from reference 1 in structure.

Although the Examiner asserts that the etching stopper film of Shiota corresponds to the ammonium ion production preventing layer of the present invention, the etching stopper film is never laminated onto the SiON film and is hard to laminate onto the SiON film. That is, since the etching stopper film is for preventing advance of etching of the SiON film, or is for making easy terminal point detection of etching of the phase shifter film (page 6, paragraph [0082]), it must be formed between the substrate and the SiON film.

Thus, the present invention claimed in new independent claims 1, 4, 5, 9, 24, and 25 is distinguished from Shiota on the basis of the ammonium ion production preventing layer formed on the thin film (includes the light shielding film, the reflection preventing film, or the light-

semitransmissive film). Consequently, the invention defined by each of these claims is patentable.

Dependent Claims

The remaining claims are also patentable because these claims depend from a patentable independent claim.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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